

ADEQ Response to Arizona Mining Association's Science and Technical Comments of September 9, 2005

The following addresses each comment presented by the Arizona Mining Association (AMA) in their document dated 9 September 2005. Each comment is preceded by the Section Number from the AMA document. The relevant comments by AMA are summarized followed by ADEQ's response. The ADEQ believes that the author of the AMA comments intentionally misrepresents citations and only presents portions of referenced material that supports the AMA's opinion and intentionally leaves out other information.

Ryan Environmental prepared a detailed critique for the Arizona Mining Association (AMA) of the modeling approach used by Weston Solutions, Inc. (Weston) for evaluating whether certain stationary source categories should be subject to the requirements of the Arizona hazardous air pollutant (HAPs) rules. The comments seem to be intentionally misleading by making numerous misrepresentations:

- The premise of the critique is based, in part, on a selective reading of the definition of adverse health effects found in ARS §49-401.01(2) by ignoring a key phrase in the definition and falsely quoting Weston and/or ADEQ. ““Adverse health effects’ means those effects that result in ***or significantly contribute to*** an increase in mortality ...” (emphasis added). The words “potentially result in adverse effects” and “result in risk of adverse effects” never appear in any ADEQ document or presentation regarding the modeling approach used for the analysis.
- The critique ignores the clearly articulated sources of information used for modeling, which was all information provided to ADEQ and the County air pollution agencies by each individual source that was modeled by Weston. ***No hypothetical sources were anticipated to be or actually modeled by Weston to develop the list of source categories that would be covered under the HAPs rule.*** In many cases, assumptions needed to be made about the emissions and their characteristics, all of which are documented in detail within the source-by-source modeling results, and were widely distributed and posted to the ADEQ Web site. It was also made very clear that if the information used or assumptions made by Weston were incorrect, the new data should be forwarded to ADEQ and Weston so the actual source could be remodeled using more accurate inputs to the model. This stands in sharp contrast to the approach used by Ryan Environmental, where only hypothetical sources are discussed and no documentation is provided.
- Ryan Environmental, on several occasions misuses source documents by mischaracterizing the authority of the sources, taking source material out-of-context, and even tampering with the materials cited.
- Ryan Environmental makes statements that are unsupported by the data presented.

- Much of the analysis is so poorly documented that the so-called statistics provided cannot be derived or duplicated by either Weston or ADEQ. Ryan Environmental failed to submit any of the modeling they conducted so that it could be analyzed by ADEQ for completeness and accuracy.

The ensuing discussion details these misrepresentations and others committed by Ryan Environmental and endorsed by AMA. Each response is preceded by the Section Number from the AMA document. The relevant comments by AMA/Ryan Environmental are summarized followed by ADEQ's response. The ADEQ believes that the author of the AMA comments intentionally misrepresents citations and only presents portions of referenced materials that support the AMA's opinion while leaving out other critical information.

Section 2.1

AMA Comment:

The AMA refers to the EPA Guidelines on Air Quality Models and states that these guidelines only apply to criteria pollutants. The AMA states that SCREEN3 is not a relevant model for conducting HAP analyses and cites a presentation made by an EPA employee of the National Exposure Research Laboratory as EPA policy that recommends models for modeling of HAP emissions. The AMA also states that ADEQ should have used more refined models and the AMA conducted additional analyses using the ISC model with one year of meteorological data to show that ISC would produce lower concentrations than SCREEN3.

ADEQ response:

The AMA has mischaracterized EPA's modeling guidance regarding criteria pollutants. The EPA guidance covers criteria pollutants only because criteria pollutants are the only pollutants covered by the federal permitting program that would require air quality modeling. None of the EPA permitting programs require modeling for HAPs. The EPA guidance (40 CFR Part 51 Appendix W¹) does state that SCREEN3 can be used "where a preliminary or conservative estimate is desired ... EPA has published guidance for screening procedures ... and a computerized version of the recommended screening technique, SCREEN3, is available." The use of SCREEN3 in this manner was the intent of the ADEQ analysis. EPA's SCREEN model guidance document, "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources" (EPA, 1992) states, "The techniques can also be used, where appropriate, for new major or minor sources or modifications subject to new source review regulations, and existing sources of air pollutants, *including toxic air pollutants*." (emphasis added)

The reference used by the AMA as EPA guidance on modeling HAPs, "What Human Exposure Data and Models are Available?" (Özkaynak, 2002²) is not an EPA guidance document; in addition, the presentation is taken out of context by the AMA. The reference is to a presentation made in approximately 2002 (according to the date of the document) by Halûk Özkaynak with EPA's National Exposure Research Laboratory. An email from Mr. Özkaynak stated, "The list of models shown were examples of certain types of models and not intended to be an exhaustive list. My focus then was on listing more detailed models rather than screening level models at that time." (Eldridge, 2005³ personal communication). The AMA erroneously references this

¹ 40 CFR Part 51, Appendix W, Section 4.2.1.

² Note that in the AMA comments this document was referenced as being published in 2005 when in fact the document date is 2002.

³ Personal communication between Mr. Kevin Eldridge and Haluk Ozkaynak, 15 September 2005.

document in their critique as if it were EPA policy when it clearly was a general non-policy presentation made by an EPA staff member that was posted to the internet and ***not EPA policy***.

In their modeling demonstration, the AMA used only one year of meteorological data to conduct ISC modeling. One year of meteorological data is not adequate to demonstrate that the ISC model would always show lower 1-hour impacts than the SCREEN3 model. In reality, it is possible for ISC to predict higher 1-hour concentrations than SCREEN3. The analysis is disingenuous in that Ryan Environmental selected the source to model to produce the outcome that the AMA wanted. The analysis produced by the AMA was only conducted for one of the emission scenarios (the generic volume source) and not for the wide variety of emission scenarios modeled by the ADEQ. To adequately demonstrate that ISC always predicts lower than the SCREEN3 model in all cases, it would require an extensive analysis of all the modeling scenarios modeled by the ADEQ for each facility and a larger set of meteorological conditions (i.e., 5 years of data per EPA guidance; See 40 CFR Part 51, Appendix W, section 9.3.1.2). The AMA did not provide any modeling files to support the modeling conducted by Ryan Environmental, nor did they provide a complete description of the modeling approach and assumptions. Therefore, ADEQ is not able to comment on the accuracy of the AMA's modeling.

Conducting refined ISC modeling for each HAP emitted at each facility would be time and resource intensive. An estimated dollar amount to conduct refined ISC modeling for all the facilities modeled with SCREEN3 in the ADEQ analysis would easily exceed \$100,000.

The Risk Management Analysis (RMA) process allows any applicant subject to the HAPRACT rules to conduct an analysis in which a more refined model could be utilized as approved by the ADEQ.

Section 2.2

AMA Comments

The AMA points out that the CMAQ model should be used for photo-chemically reactive pollutants although they recognize the difficulty of utilizing the CMAQ model and that “developing a CMAQ photochemical grid analysis for one HAP will be people and computationally intensive...” To substantiate this, the AMA presents results of a paper by Ching et al, 2004 shows that “For the reactive HAPs benzene and formaldehyde the CMAQ produces 75% to 25% lower concentrations than a non-reactive ISC analysis.”

ADEQ response

CMAQ is a regional scale model and not intended for the type of modeling that was conducted by ADEQ. 40 CFR Part 51, Appendix W⁴ states: “Use of models incorporating complex chemical mechanisms should be considered only on a case-by-case basis with proper demonstration of applicability. These are generally regional models not designed for the evaluation of individual sources...” Chemical transformations in the atmosphere are complex and require transport distances of several kilometers. Since the ADEQ modeling shows that for most facilities the maximum impact would occur within 1,000 meters of the facility, there would not be adequate time for photochemical reactions to occur that would make any difference in the predicted concentrations. Therefore, photochemical reactions were not considered applicable to

⁴ Appendix W, Section 8.2.6.b

the screening analysis conducted by ADEQ. ADEQ also points out that worst-case meteorological conditions often occur at night where photochemical reactions would not occur.

The AMA statement regarding the results of the Ching paper is generalized and the ADEQ was not able to duplicate the percentages presented by the AMA. This is another example of the AMA citing material and misrepresenting the intended results.

Section 2.3

AMA Comments

The AMA points out that the modeling should have considered dry and wet deposition and presented the results of a modeling scenario stating “The particle-bound HAP size distribution used was required by ADEQ for a recent study”. The results show that concentrations are lower using ISC with dry depletion than using SCREEN3.

ADEQ Response

To properly use the ISC model to determine dry and wet deposition, considerable information is required regarding particle sizing, etc. that is not normally readily available. The magnitude of the effects of dry/wet deposition is heavily dependent on the exact particle size distribution, particle density, source characteristics, meteorology, and other variables. The ratios shown in Table 2-2 (generic volume source with natural dust emissions) cannot be extrapolated to the wide variety of the other facilities modeled by ADEQ. Further, natural crustal materials are specifically exempted from regulation as HAPs,⁵ which renders the example provided irrelevant. Once again the AMA is intentionally misleading and constructs the worst-case scenario to support its conclusions.

Not much wet deposition would occur in Arizona and many of the pollutants modeled by ADEQ would not be in particle form. In addition, if deposition is occurring near a facility, these materials would be accumulating in the environment, and become available to enter the body through a variety of different pathways not considered by the ADEQ analysis, including re-entrainment into ambient air.

The time and resources needed to conduct a dry/wet deposition analysis for the facilities modeled by ADEQ would be extensive, likely costing several hundred thousand dollars. Not only would source specific information regarding particle size and distribution need to be collected but the meteorological data would need to be reprocessed.

The ADEQ cannot properly review the modeling conducted since the AMA did not supply detailed information on the analysis conducted by them but only referred to a “recent study”. However, ADEQ believes the deposition information was obtained from the Salt River PM₁₀ study. ADEQ points out that the facilities modeled during the Salt River study would not be subject to the HAPRACT regulations since they are specifically exempted from the program (i.e., sources of dust consisting of natural crustal material per 49-426.06(I)). Since detailed modeling information was not supplied, ADEQ cannot comment on the validity of the alleged

⁵ See ARS §49-426.06(I)

modeling results. ADEQ had made source material available to the public during the stakeholder process and the AMA has not returned the favor.

ADEQ also notes that the AMA confuses the terminology “depletion” and “deposition” interchangeably. These are two separate (but related) processes in the ISC3 model. The deposition-only algorithms in ISC3 do not remove mass from the plume.

ADEQ agrees that the use of ISC with wet/dry deposition and depletion is appropriate in certain situations and would consider these options on a case-by-case basis as part of an RMA.

Section 2.4

AMA Comments

The AMA points out that the ADEQ study uses a receptor array that starts 25 meters from the facility being modeled and that this is too conservative of an assumption.

ADEQ Response

The receptor array *begins* at 25 meters, and extends out to 10 kilometers. In addition, the SCREEN3 model locates the specific distance to the overall maximum concentration at or beyond 25 meters. It is this overall maximum concentration that was used in the decision process, regardless of the distance where it occurred. However, the distance to maximum concentration was specifically 25 meters for only some of the facilities modeled by ADEQ. Since the HAPs program only applies to new and modified existing sources, the location of the nearest receptor to a facility for facilities that will be subject to its requirements is unknown. ADEQ feels that 25 meters adequately represents conditions that currently occur at existing facilities Arizona.

Section 2.5

AMA Comments

The AMA states “1000 meters (0.635 miles) is a more realistic distance from a generic emissions unit to a generic residence”.

ADEQ Response

ADEQ reiterates that 25 meters was not a single distance used in the evaluation. SCREEN3 was run to evaluate distances from 25 meters to 10 kilometers. See response to Section 2.4 above. ADEQ acknowledges that in many cases, concentrations 1,000 meters from a source may be less than those at 25 meters. However, this is heavily dependent on the nature of the source and meteorological conditions. Once again, the AMA does not provide any evidence to support the claim that the arbitrary distance of 1,000 meters is more realistic. This is obviously based on an unsubstantiated opinion and not fact. In reality there are residences within 25 meters of existing facilities. ADEQ reiterates that the statute focuses on ambient air, and long-standing ADEQ policy defines ambient air beginning at the Process Area Boundary. The specifics of the relative location of potentially exposed individuals may be addressed as part of a RMA.

Section 2.6

AMA Comments

The AMA states that the evaluation of outdoor concentrations is “another conservative assumption”. The AMA presents a figure from a newsletter published by the Lawrence Berkeley National Laboratory to support the claim that “measured indoor concentration was about 10% of that outdoors.”

ADEQ Response

The Arizona statute requires analysis of ambient air not indoor air. Many children and adults recreate outside and children tend to spend more time outdoors than adults, and breathe more air per unit of body mass than adults.

The AMA uses as examples ozone and ammonia nitrate to support their claim, which are not listed compounds for the HAPRACT rule. The AMA presents limited information on particulate matter (ammonia nitrate aerosol), but overlooks the fact that volatiles would behave quite differently than particulate matter. The results presented by the AMA for a study conducted by the Lawrence Berkeley National Laboratory, 2003 only showed the figure for nitrate but failed to show the other chemicals analyzed. The unadulterated figure is presented below, and the entire page from the newsletter is contained on the following page. Enclosed in the red box is the portion of the graph from this newsletter presented by the AMA in their report. As can be seen the AMA has tampered with the figure in the Lawrence Berkeley National Laboratory newsletter to only show part of the graph that supports their claim. This intentionally misleads the reader rather than facilitate honest discourse. As shown in the graphs (intentionally omitted by AMA), for carbon compounds, indoor concentrations are similar to outdoor concentrations and have occasion to exceed the outdoor concentration. Particle-bound carbon is also representative of many of the compounds included in the HAP modeling analysis.

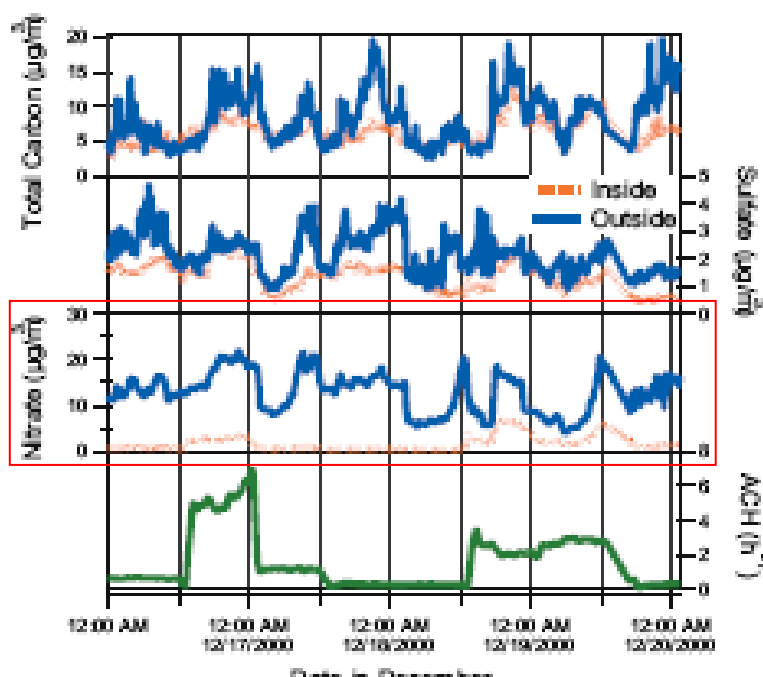


Figure 3. Data from the ICVS showing the variation in indoor (blue solid line) and outdoor (red dotted line) carbon, sulfate, and nitrate for a four-day period during the December intensive. The bottom plot shows air exchange rate as a function of time.

Indoor Concentrations of Outdoor Aerosols

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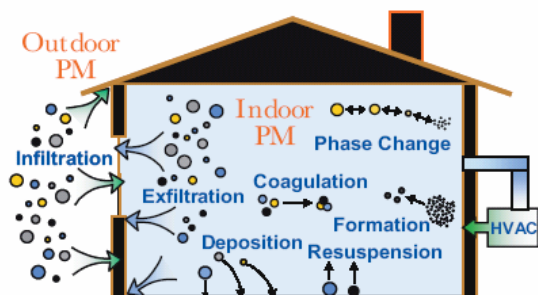


Figure 2. Schematic of the Clouts, CA research house showing the important processes that affect the indoor concentration of outdoor PM_{2.5}.

Field Study Methods

The field study collected time and chemical data on both indoor and outdoor concentrations of PM_{2.5}, while ventilation, heating and cooling conditions were manipulated in the house. Measurements were made in October and December of 2000 and January of 2001. The house was unoccupied during these measurements to remove any confounding effects of indoor sources.

The research house was outfitted with a number of instruments to characterize particle size and chemistry simultaneously both indoors and outdoors, as well as meteorological variables including temperature and relative humidity. In addition, the house was instrumented to continuously measure ventilation rate. A new instrument, developed in part for this study, was key to characterizing the time-resolved behavior of important chemical species. Developed by Aerosol Dynamics Inc. (Berkeley CA), the instrument is an integrated collection and vaporization cell (ICVC) that enables measurement of concentrations of ammonium sulfate, ammonium nitrate, and carbonaceous aerosols with 10-minute time resolution.

Variability in Indoor Aerosol Concentrations

Figure 3 shows results from the ICVC system, which show the variation in indoor and outdoor aerosol concentrations for a four-day period during the December measurement effort. The figure also shows the ventilation rate, indicated as air changes per hour (ACH). The results show that there is considerable variability in both the indoor and outdoor concentrations of all three species as well as in the magnitude of the difference between the indoor and outdoor concentrations.

In general, during periods of increased ventilation rate, the difference between the indoor and outdoor concentrations decreased. The most striking feature of Figure 3 is that the individual chemical constituents of PM_{2.5} behave differently after entering into the residence. The difference between indoor

and outdoor ammonium nitrate concentrations is much greater than the differences measured for sulfate or carbon. Ammonium nitrate is a chemically active species that exists in equilibrium with gaseous nitric acid and ammonia. Upon entering the residence, the ammonium nitrate dissociated into its gas phase precursors, which were subsequently lost to the house surfaces by diffusion.

The differences in behavior between individual PM_{2.5} chemical species and the dissociation of the ammonium nitrate aerosol illustrate that an exposure assessment based on total particle mass measured outdoors may not accurately represent actual human exposures to indoor particles of outdoor origin and may obscure the causal relationships involved. Ammonium nitrate is a significant outdoor pollutant in the Western United States. The extent to which it may or may not be a significant source of indoor exposure has important policy implications for control of sources that lead to ammonium nitrate formation. These results emphasize the need for chemical characterization of PM_{2.5}, and further studies of the physical and chemical transformation processes influencing the indoor concentration of particles that originate outdoors.

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Nancy Brown served as principal investigator for this research, and Rich Sextro along with Susanne Hering (of Aerosol Dynamics Inc. of Berkeley CA) were co-principal investigators. Other EETD scientists who contributed to the project are Marc Fischer, David Littlejohn, Lara Gundel, Thomas Kirchstetter, and Ray Dod.

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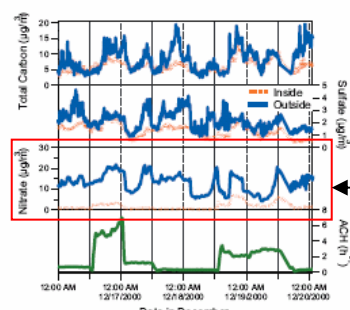


Figure 3. Data from the ICVS showing the variation in indoor (blue solid line) and outdoor (red dotted line) carbon, sulfate, and nitrate for a four-day period during the December intensive. The bottom plot shows air exchange rate as a function of time.

Portion of graph shown by AMA

Section 2.7

AMA Comments

The AMA points out that the modeling protocol states that it followed EPA guidance and makes an exception for determining the location where the public is exposed to air emissions, otherwise known as the “ambient air” and questions the use of “process area boundary” in determining where to place modeling receptors.

ADEQ Response

The modeling proposal stated that the modeling would follow EPA modeling guidance (40 CFR Part 51, Appendix W) and ADEQ modeling guidance (ADEQ, 2004). Since Appendix W does not discuss ambient air,⁶ ADEQ used modeling guidance that has been used in Arizona for over 20 years. The ADEQ modeling guidance specifically discusses the Process Area Boundary concept and this is what was used in the HAP modeling analysis. In addition, *no permit has ever been denied in Arizona because of the Process Area Boundary policy.*

Section 2.8

AMA Comments

The AMA shows results of an analysis presenting a comparison between rural and urban modeling. The AMA quotes a Weston employee as stating “that most HAP sources in Arizona are in rural areas and that there overall is not a large difference in predictions when using rural or urban dispersion coefficients”. The AMA present modeling results that are intended to refute this statement. The AMA also quotes a Weston employee as stating that “it generally is very difficult to show an urban land use that warrants use of urban dispersion coefficient.” The AMA goes on to quote the method for determining urban land use.

ADEQ Response

The AMA did not show that any facility modeled by the ADEQ would be located in an area that would be classified as urban with the use of either SCREEN3 or ISC. The AMA is making unsubstantiated statements that have little to do with the analysis conducted by ADEQ to intentionally discredit that work without presenting any relevant facts, standards or counter-analysis. Further, AMA intentionally misleads readers of their comments by not providing descriptions of urban and rural characteristics as they are relevant to the dispersion models.

Once again the AMA takes an “apples to oranges” approach to achieve the results they desire:

- The AMA has misquoted the Weston statement regarding urban and rural dispersion. This statement is correct only when comparing modeling results for urban versus rural dispersion factors *under the same meteorological conditions*. When urban mode is chosen, both the SCREEN3 and ISC models shift the stability class, which is an inherent modification of meteorological factors.
- The AMA is comparing the results of two different models.

⁶ Note the references made in the AMA critique quote EPA memorandums that were written outside of Appendix W guidance.

- The results in Table 2-1 of the AMA comments are specifically for the generic volume source at a 25 m distance, which cannot be extrapolated to the variety of other sources modeled by ADEQ.

Ultimately, the comparison of modeled pollutant ambient air concentrations under the rural versus urban classifications used by these two dispersion models will be dependent on source characteristics, meteorology, and distance.

The second Weston statement is also intentionally misinterpreted. The Weston staff member did not intend to say it would be difficult to show an urban condition if one existed. Rather, his meaning was that a very few areas within Arizona would be classified as having urban configurations as defined for the purposes of modeling using SCREEN3. Weston is familiar with the classification systems cited by the AMA. The land-use classifications for urban categories (from the Auer, 1978 referenced document) are not described by AMA to substantiate its claim that ADEQ has intentionally mischaracterized the location of these sources. ADEQ, to reveal the facts, will provide these descriptions, as follows:

- I1 – Heavy Industrial
 - Major chemical, steel and fabrication industries; generally 3-5 story buildings, flat roofs
 - Grass and tree growth extremely rare; <5% vegetation
- I2 – Light moderate industrial
 - Rail yards, truck depots, warehouses, industrial parks, minor fabrication; generally 1-3 story buildings, flat roofs
 - Very limited grass, trees almost totally absent, <5% vegetation
- C1 – Commercial
 - Office and apartment buildings, hotels, >10 story heights, flat roofs
 - Limited grass and trees; <15% vegetation
- R2 – Compact residential
 - Single, some multiple, family dwellings with close spacing; generally <2 story, pitched roof structures; garages (via alleys), no driveways.
 - Limited lawn sizes and shade trees; <30% vegetation
- R3 – Compact residential
 - Old multi-family dwellings with close (<2 meters) lateral separation; generally 2 story, flat roof structures; garages (via alleys) and ash pits, no driveways
 - Limited lawn sizes, old established shade trees; <35% vegetation

In summary, “urban,” as used for the purposes of the SCREEN3 and ISC models, requires high density of relatively tall buildings, which is not the same as “urbanized.” A majority of the land-use in Arizona would not fit into these “urban” land-use categories, especially in the areas where the facilities modeled are located. It is rare that you would ever find these types of urban land use in proximity to the HAP sources located in Arizona. In addition, since the modeling is being used to determine whether future facilities or modifications to existing facilities would be subject to HAPRACT, the rural mode was selected since it is not known if the modification or new facility will be located in an urban or rural area. Finally, the AMA failed to recognize that, for

some facilities, both models may predict higher concentrations with the urban mode selected than they would with the rural mode.

Section 2.9

Comments

The AMA states that the use of the volume source in the ADEQ modeling analysis reflects conservatism imposed when HAP sources released from elevated stacks are described by the Proposal's hypothetical low-level source and references two papers they claim show that "... ground-level concentrations are 500% to 800% more with low-level emissions".

ADEQ Response

ADEQ understands that release height is an important factor in dispersion. The ADEQ modeled facilities as they existed in the state and local agency databases based on information supplied by the facilities. The AMA continues to miss this fact and concentrate on only one aspect of the analysis (i.e., the volume source modeling). In addition, if a specific source wishes to correct the modeling conducted for its facility, it can supply the appropriate information to ADEQ. Only when information was not available to model a facility was the generic volume source used. Therefore, this comment is misleading, since many facilities with elevated stacks were modeled using the information provided by each individual source and found in ADEQ and county stationary source databases.

ADEQ was not able to determine from the relatively old references (one over 30 years old and the other over 20 years old) presented by the AMA the rational basis for the "500% to 800%" values presented by the AMA. Once again, the AMA is fabricating statistics to intentionally mislead the reader by referencing documents and citing information not present in those documents.

Section 2.10

AMA Comments

The AMA states that the summation of emissions from multiple stacks is too conservative and provides an example to show a case where concentrations may be overestimated by a factor of 2.8.

ADEQ Response

Once again the AMA is relying on hypothetical data to achieve arbitrary conclusions and not evaluating the actual modeling conducted by ADEQ. The summation of concentrations from different stacks is a routine screening technique. ADEQ recognizes that stack separation has impacts on modeling results. An applicant would be able to use this information in an RMA to avoid the application of HAPRACT. The scenario presented by the AMA is hypothetical and does not represent any of the facilities modeled and is therefore arbitrary. The magnitude of the impact of actual source geometry is a factor of exact source geometry, source characteristics, building downwash, meteorology, and distance. The AMA's example once again relies on an arbitrary geometry, the generic volume source characteristics and the specific 25-meter receptor distance. The facilities actually modeled by ADEQ had a variety of characteristics, and not all maximum concentrations occurred at 25 meters. Therefore, the arbitrary factor of 2.8 cannot be extrapolated to all sources.

Section 2.11

ADEQ Comments

The AMA asks how cavity zone concentrations will be determined.

ADEQ Response

Although the regulatory default cavity option in SCREEN3 was used to calculate cavity zone impacts, these results were not used to determine maximum impacts from any facility.

Section 2.12

AMA Comments

AMA reiterates that the approach of using the closest approach of the Process Area Boundary for determining the closest receptor to be modeled is inappropriate. The AMA reiterates that chemical transformations are ignored and states that choosing stacks with least dispersion potential is “conservatism upon conservatism”.

ADEQ Response

This is a program to protect the public from potential exposure to HAPs. ADEQ has chosen a conservative approach because the location and orientation of future facilities is not known. In applying SCREEN3 to other regulatory modeling applications using fence/property lines, routine procedure is to use the closest approach of the fence/property line (the beginning of ambient air). This is not an inappropriate basis for choosing a distance to model at a screening level. The modeling analysis follows typical screening procedures as intended. None of the assumptions or procedures used in the analysis were atypical for regulatory screening modeling analyses.

A choice of stacks to model based on their dispersion potential was only done where multiple HAP-emitting stacks were present, but only a single total emission rate for all of them was available. The method used is based on EPA guidance for the original SCREEN model.

Section 3.0

AMA Comments

The AMA states that when the “multiple conservative features in the Proposal are combined, the problem [of overestimation] is compounded.” AMA uses an example of a gas station emitting 0.29 TPY of benzene and claims the peak annual impact of this gas station using the Proposal methodology is $84 \mu\text{g}/\text{m}^3$ and that this concentration is “dramatic and illustrates the overly conservative nature of the Proposal”.

ADEQ Response

Figure 3-1 presented by the AMA is intentionally deceptive in its presentation since it is double counting impacts of each element discussed in Section 2 of the AMA comments. It is not appropriate to add the results in this manner. Throughout the analysis presented, the AMA relied almost exclusively on ISC modeling analyses using the generic volume source, a 25-meter receptor distance, and a single year of meteorological data. In addition, the deposition analysis relied on a particle size distribution for crustal dust that would not be applicable to the sources being evaluated for HAPRACT. The factors of conservatism derived with these narrow bounds are then generalized to broad groups of sources. As indicated in the responses to many of the

comments, such extrapolations are scientifically inappropriate. Adding the results together as presented in the figures compounds the problem with the extrapolations.

The gas station example used by the AMA is inappropriate for comparison to the HAPRACT process. The reference for the 0.29 tpy benzene emission from a gas station is fairly old (1994) and likely benzene emissions from a modern gas station would be less. Gas stations (SIC 5541) were not considered in the HAPRACT modeling. In addition, the 0.29 TPY emissions are below the statutory emissions threshold of 1 TPY for applicability of the HAPRACT program. The AMA cited concentration for the facility as a volume source appears to be inconsistent with the Proposal's actual modeling approach based on the information provided in the report. The modeling conducted by the ADEQ for the default volume source produced a maximum 1-hour concentration for the volume source at 25 meters of 6,588 ($\mu\text{g}/\text{m}^3$)/(g/s). Using the Proposal's methodology for deriving short-term emission rates, the cited emission rate of 0.29 TPY would be divided by 8,760 hours (since operating hours were not given by the AMA), yielding 8.34×10^{-3} g/s. The corresponding peak 1-hour impact is thus 54.9 $\mu\text{g}/\text{m}^3$. Multiplying by the scaling factor of 0.08 to obtain the annual concentration gives 4.4 $\mu\text{g}/\text{m}^3$. It is unclear how the AMA arrived at the 84 $\mu\text{g}/\text{m}^3$ result. The annual value of 4.4 $\mu\text{g}/\text{m}^3$ obtained by applying the assumptions in the Proposal is actually less than the 8.0 $\mu\text{g}/\text{m}^3$ background value cited for Phoenix. The screening result is not overestimated by "dramatic" multiple orders of magnitude.

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